

## MEETING MINUTES (FINAL)

### CITY OF TUCSON HABITAT CONSERVATION PLANS (HCPs)

#### Technical Advisory Committee (TAC)

Wednesday, November 18, 2009, 1:00 – 4:00 p.m.

U.S. Fish & Wildlife Service, Tucson Field Office

201 North Bonita Avenue, Suite 141

Tucson, Arizona 85745

#### ATTENDEES

#### City of Tucson (COT) Habitat Conservation Plans (HCPs) Technical Advisory Committee (TAC) members present:

Dennis Abbate (Arizona Game and Fish Department, Research Branch)

Marit Alanen (U.S. Fish & Wildlife Service)

Rich Glinski (Arizona Game and Fish Department – *retired*)

Paul Green (Tucson Audubon Society)

Trevor Hare (Coalition for Sonoran Desert Protection)

Ries Lindley (City of Tucson – Tucson Water Department)

Guy McPherson (University of Arizona)

#### Other Attendees, including *ex-officio* TAC members, present:

Sherry Barrett (U.S. Fish & Wildlife Service) *present for the beginning of the meeting only*

Jamie Brown (City of Tucson – Office of Conservation and Sustainable Development)

David Grandmaison (Arizona Game and Fish Department)

David Jacobs (Arizona Attorney General's Office / Arizona State Land Department)

Beth Scott (University of Arizona, Drachman Institute)

#### 1. Welcome, introductions, and ground rules

#### 2. Review TAC meeting minutes

TAC members approved the minutes with edits from Rich and Linwood.

#### 3. Updates

There were no updates.

#### 4. Discussion

##### Changed and Unforeseen Circumstances

Jamie said that the Technical Advisory Committee (TAC) discussed the topic of *changed and unforeseen circumstances* briefly at the October meeting. Given several outstanding questions, Sherry Barrett attended to help answer them. Jamie said that, at the last meeting, it was suggested by a TAC member that, in 10 years or so after Incidental Take Permit (ITP) issuance, that the

TAC and the U.S. Fish and Wildlife Service (USFWS) should review the *changed and unforeseen circumstances* and make revisions/additions to the circumstances and responses as needed. Jamie said that his understanding is that this could require an HCP amendment. So there was a TAC member question about whether or not there is USFWS guidance on reviewing *changed and unforeseen circumstances* to clarify this point. In other words, should the City of Tucson (COT) convene such a 10-year review and if revisions/additions were recommended by the future TAC and USFWS to the *changed and unforeseen circumstances* table, would this require an HCP amendment? If so, what does an HCP amendment entail?

Sherry responded by reminding the TAC that *changed circumstances* are those that are reasonably likely to occur during the term of the ITP. Since these are the permittee's responsibility to address, the HCP needs to include a table that addresses these circumstances and what the COT will do to respond. In some cases, there may be no response. As an example, she mentioned a flood on a healthy river system like the San Pedro River. One wouldn't go back and plant cottonwood trees because a flood is natural and one would expect natural restoration to occur. So, one might list as a *changed circumstance* that a 100-year flood may occur, but the response is simply "no response." Other *changed circumstances* may be the presence of non-native, invasive species or fire. Those are activities that we can reasonably expect to occur or are likely to occur or continue to occur. These are items that should be included in the HCP.

Sherry said that the *unforeseen circumstances* are those circumstances that are not reasonably expected to occur over the life of the permit. If those occur, it is not the COT's responsibility; it is the responsibility of the federal government to address these. However, Sherry noted that federal government does not yet have a contingency fund should these circumstances arise. But, the whole concept of the "No Surprises" regulatory assurances is that a "deal is a deal" for the permittee and that the federal government would not continue to change things after permit issuance. There is certainty about what is expected of the permittee as they implement that permit. So, in response to the question about whether or not the *changed and unforeseen circumstances* would be revised, the answer is not unless the COT was willing to do so. Sherry said that the COT could agree to additional revisions and that additional measures would not necessarily require an amendment to the HCP because it would not involve altering what is analyzed. If the proposed revisions would require altering the analysis of take, then this would involve amending the ITP. One needs to amend the ITP through the full process if it is going to change the amount of incidental take, the boundary, or the species that are being analyzed. In summary, Sherry said that the USFWS would not move some of the *unforeseen circumstances* into the *changed* category.

Sherry said that the TAC needs to think about what is reasonably foreseeable. Probabilities come to mind, such as flooding frequency and fire intensities. There is an unlimited number of species that could invade and so one might have a general response because the USFWS wouldn't necessarily know which species would invade over the 50-year term of the ITP. She said that the TAC should also consider the capabilities of the COT. There may be species that invade that are far beyond the capabilities of the COT to respond to. Thus, the circumstance really needs to be within the COT's capabilities.

Ries asked what happens if a new, listable species is found to inhabit or use the Avra Valley HCP Planning Area. Sherry said the first question that the USFWS would ask is: “Is it a species already covered in the HCP?” If not, the COT then decides if an amendment is necessary based on whether or not take is likely to occur. Also, Ries thought that the species could probably be permitted separately, if necessary. Sherry said that the COT could also look at the conservation measures being implemented for other species and work with the USFWS to see if those measures are adequate to mitigate for the new species. Or, the USFWS may describe the additional conservation measures that would be needed to cover it. Trevor said that circumstance number 3 on the latest *changed circumstances* table addresses this in terms of comparing the modeled habitat and seeing if it overlaps with that of the new species. Sherry said that with these landscape level plans, hopefully, the TAC and COT have adequately addressed the species’ needs. And, she said maybe this new species is not a species that was listed just because it occurs in Avra Valley, but because it occurs in a larger area and was listed because of that.

In terms of additional questions for Sherry, Jamie quoted from the October TAC meeting draft minutes. The minutes state that, “Rich said that a circumstance that should be considered [for the *changed and unforeseen circumstances* table] is a situation in which a recovery strategy for a species, such as the cactus ferruginous pygmy-owl (CFPO), is changed. This may involve captive breeding. Trevor agreed and said that if there is a release, there is a question of whether or not those individuals are considered ‘non-essential.’” Jamie asked Sherry if the USFWS would treat captively reared birds differently and how this may affect the HCP. Sherry said that these birds would likely be treated differently and would be considered augmented birds. She said that as the TAC may know, there are some CFPO in captive breeding right now, yet they only had two fledglings this year. Sherry said that although that effort is not going as well as hoped, a lot is being learned. AGFD is conducting habitat assessments to determine where to release the birds. These released birds would have a different status because the USFWS wants to encourage the jurisdictions to work with the USFWS on getting them out in the landscape. If the USFWS imposes additional restrictions, no one will let the USFWS release them. So, the USFWS wants to work with all of the jurisdictions doing HCPs to find flexibility in our response to those birds.

Sherry said that she spoke with Scott Richardson (USFWS) about this issue in particular. She said a good next step would be to discuss this further with Scott and those working on the Town of Marana HCP so that the responses are comparable and consistent. Basically, this would yield some level of take given the population today and then another level of take if the birds were augmented, which is more flexible. Trevor said that the problem with that is that we wouldn’t know which CFPO were the augmented birds unless they had radios in them. Trevor wondered what would happen if CFPOs flew into the COT’s Avra Valley HCP Planning Area from the Tohono O’odham reservation that don’t have 10(j) rule status and those are accidentally taken. Sherry wondered if the population was moving upwards, if it mattered whether or not the birds were captively reared. Trevor said that the Tohono O’odham CFPO in his hypothetical example would most likely be a higher fitness bird. Sherry said that it could be. Sherry said that even if the population is augmented, it is highly unlikely that the USFWS would ever authorize the destruction of a saguaro that has a nesting CFPO, regardless of whether or not augmentation occurred. The difference in treatment between these two situations would probably be more some level of harm or harassment that occurs otherwise. There may be some level of mortality

that occurs with these augmented birds. But the birds that come from the Tohono O'odham Nation are more likely to be those that nest successfully. Trevor said that this question arose from the fact that the Avra Valley HCP Planning Area is currently only considered as CFPO dispersal habitat. However, if there are many more CFPO in the area due to augmentation and they may need to use this lesser quality habitat for nesting, none of the conservation measures address nesting CFPO. Such conservation measures would include prohibitions on construction in the breeding season and two years of species-specific surveys before groundbreaking could occur. So, the *changed circumstance* in this case is where an augmented population is forcing breeding in the Avra Valley HCP Planning Area.

Sherry said that there are sides of answers to this question. One would be that there is more likely to be take and more flexibility with the take if those birds are augmented. But you are also saying is that there are more likely to be additional conservation measures put into place. Those could easily be *changed circumstances* and the response is what the TAC needs to work on. The ITP would need to address that increased take that we would anticipate if that were to occur. And, the USFWS would have to be consistent with how this will be treated in Marana. Rich wondered if there is a standard USFWS response to this because, after year one, there are augmented birds in the landscape that pair up the following year and they have young that are not banded. Therefore, there would be progeny of captive bred birds in the landscape, but one wouldn't know if the CFPO detected in the Avra Valley HCP Planning Area came from the southwest somewhere like the Tohono O'odham Nation or if they were progeny of the captive bred birds. So, Rich asked if there is some treatment that the USFWS would recommend in dealing with that breeding site. In other words, would that site hold the same significance as a breeding attempt in the area? Sherry said that with the limited number of CFPO currently in the landscape, breeding birds are pretty important unless the population increases. Rich said that a CFPO population increase is a *changed circumstance* in and of itself. So, we don't have to have draconian measures for each breeding cycle. Sherry said that the TAC would have to determine what is a flourishing population level. Ries said that one breeding pair would be an infinite increase.

Jamie said that in terms of the proposed *changed circumstance* "De-listing of a Covered Species," there was a TAC member question about whether or not the COT would need to mitigate in the future for that species or not. Sherry responded by saying that the COT's HCP Covered Species consists of both listed and unlisted species. The unlisted species are on the HCP Covered Species list, but are not put on the ITP until they become listed. As soon as they are listed, they get put on the ITP. But, if delisted, they come off the ITP and they could go back and forth, on and off the ITP. She said that as long as the COT continues to implement mitigation, the COT is not on the "roller coaster" like everyone else and the COT has consistency and certainty about what is expected. If the COT chooses not to mitigate, the species comes off the permit and the COT no longer has coverage. If the species should become listed again, the COT would have to start over with the regulatory process. Trevor suggested that Jamie outline the process in which the situation is brought up for discussion by the USFWS and TAC and then the decision is put forth to the City's Mayor and Council regarding whether or not to remove the species. Sherry said that a logical response to this *changed circumstance* would be to leave the species on the list of Covered Species and continue the mitigation so that, in the event that the species is re-listed, the COT is still covered. Trevor said that there are requirements for de-

listing, but he thinks that these probably fall on the USFWS. Sherry said, yes, there are five years of monitoring required if a species is delisted because of recovery. If it is delisted because of taxonomy or court issues, then monitoring is not required. Marit added that some species get delisted because there are certain conservation actions in place that help recover the species. However, if the species is delisted and these conservation actions go away, there is no reason that the species would have recovered. In other words, the species' recovery is dependent on those conservation actions, which need to stay in place to maintain the recovery.

In terms of other questions for Sherry, Jamie said that solar energy development companies have approached the COT through Tucson Electric Power regarding a proposed lease of City-owned land in Avra Valley for large-scale solar energy projects. It looks like at least one of these potential projects is moving quickly and would need to go through the permitting process prior to issuance of an Incidental Take Permit for the Avra Valley HCP. If such a project moves forward, he asked if the property should still be included in the Avra Valley HCP Planning Area boundary. Sherry wondered if the COT would require mitigation for this project. Since the lease contains modeled burrowing owl (BUOW) habitat, Jamie said that Migratory Bird Treaty Act (MBTA) compliance by the lessee would be required, but any additional mitigation, if negotiated into an agreement, may not be what is described in the HCP. This is because those conservation actions are still preliminary and may change. Sherry wondered what the purpose of including this property in the Avra Valley HCP Planning Area would be. This is because, even if BUOW compliance to the standard of the HCP was conducted, it would not count toward credits for the HCP since it would have been applied before the HCP was approved by the USFWS. However, she said that if another entity provides mitigation property, the COT would want to manage it consistently with other mitigation lands. So, it doesn't make a lot of sense to include it, if it would be done sooner than the HCP except for the fact that the COT would want to manage mitigation lands consistently. Sherry said that any mitigation land or money that contributed prior to completion of the HCP cannot be used as credit toward any other project or it would be "double-dipping." She did say that it makes sense to have a provision in the HCP for future solar activities or an expansion of this proposed project on the Chu Farm property.

Rich said that if we were going through the process right now and applied for a permit to build this solar facility, it wouldn't be near the liability that we have now as described in the preliminary draft HCP. Trevor said that the burrowing owl has no ESA liability. Sherry said that if keeping this parcel inside the HCP boundary helps to continue to show that this is modeled BUOW habitat, that is fine. However, the COT has to be sure that the accounting stays clear.

Ries asked how the MBTA relates to ESA compliance in terms of an HCP. Sherry said that once the USFWS issues an ESA Section 10 permit (Incidental Take Permit or ITP), it serves as a special use permit of the MBTA for species listed on the ITP. She said that there are both listed and unlisted species covered under the HCP. Because the unlisted species are not actually on the Incidental Take Permit, the ITP cannot serve as an MBTA special use permit for those species. Trevor asked if they need to be consulted separately with the USFWS. Sherry said that the MBTA involves a special use permit and does not require a consultation with the USFWS. She said that this has been recognized as an issue for a long time, but it's an international treaty and so the U.S. cannot unilaterally change it. So, it's big deal to "open up" the treaty for revision, which is why there is reluctance to do so. The point at which the species is on the ESA, they

would be covered by the MBTA under the Section 10 permit. BUOW, are not listed, and so an MBTA special use permit would be required. Trevor said that the Western yellow-billed cuckoo would also need to comply with the MBTA and Sherry also mentioned the CFPO.

Rich said that one of the arguments of having the bald eagle delisted and covered under the MBTA is that there are more “teeth” in the MBTA. Given this, he wondered if the MBTA gives the Western yellow-billed cuckoo (WYBC) and cactus ferruginous pygmy-owl (CFPO) more protection. Sherry said that the MBTA has nothing to do with habitat and is a treaty put in place in reaction to the feather trade. It’s focused on the animals, their feathers, the eggs, and their nests, and that’s it. It has nothing to do with habitat and has no consultation provisions. There is no provision for citizen suit under the MBTA. Trevor said that one just applies for a permit and that’s it. Sherry said that the permit provisions are pretty limited.

Trevor said he thought that climate change was once listed in a table of *changed or unforeseen circumstances* and wondered about that. Jamie said that Sherry clarified that issue with him before the table was created, saying that the potential effects of climate change (e.g., prolonged drought) are what belong in a table, not climate change as a whole. Sherry agreed. Trevor said that climate change involves unforeseen aspects. For example, there may be increased flooding, increased wildfire frequency, and increased drought. However, beyond this, there are many unknown possibilities. So, Trevor asked if the USFWS is not only asking that that larger term “climate change” also be included in *unforeseen circumstances* where there is some provision for something that happens that the TAC could not foresee. Sherry said that the endgame for all permits regardless of these *changed and unforeseen circumstances* is that if we get to the point where the permit is jeopardizing the species, the USFWS can revoke it. Trevor said that that is something that the COT may ask of you if something happens beyond its capacity to address as part of the HCP.

Jamie said that, based on TAC member comments at the last meeting and via e-mail he revised the table so that all of the circumstances were considered *changed*. Trevor said that there are circumstances in the Pima County HCP that are unforeseen, such as catastrophic war, etc. This way, should these occur, Pima County is covered. In legal language, Ries noted that he often sees these types of circumstances described as “acts of God.”

Jamie asked if the TAC had any comments, edits, revisions, or suggestions to the *changed circumstances* table he distributed before the meeting. Rich thought that the circumstance of a new invasive plant species occurring within the HCP Planning Area should be considered *unforeseen*. Trevor said that he thinks it should be considered *changed* and mentioned two new plant species recently detected at Las Cienegas National Conservation Area. In terms of the response, Trevor said that some of them should be vague given some uncertainty about the circumstance and that is okay. Rich said that we are expecting worst case scenarios such as invasive plants and disease entering the area. Trevor said that he thinks that this is about risk management. He added that if the COT and TAC do jobs correctly, hopefully, a resilient ecosystem will be maintained.

Rich wondered if it really mattered which category – *changed or unforeseen* – the circumstances are put in. Marit said yes, because the categories define the responsible party. Guy said that from

a legal perspective, the permittee wouldn't want any circumstances in the *changed* category; they want them all in the *unforeseen* category. Ries said that if the USFWS disagrees and the COT hasn't been pessimistic enough in planning, then the COT must amend the permit. So, he thinks the COT is better off categorizing anything we think of that's foreseeable as *changed*. Ries said he agreed with Trevor that it's foreseeable that new species will continue to appear, such as if a rancher nearby brings in cattle from overseas that begin the spread of new, invasive plants. Guy said that it is almost impossible to foresee which species are going to start showing up. Ries agreed and asked if we need to know which species. Marit said that Sherry had said it's okay to leave the circumstance written in a general way in such a case.

Dennis said that as part of the definition that Sherry gave for *changed circumstances* is whether or not a response is within the capability of the municipality. For him, part of the capability is having enough funding. So, he wondered if there was a way to establish a threshold and say that the COT can address this circumstance, like a catastrophic fire, up to the threshold. After that, it is not within the COT's capability. Dennis gave the example of having these drastic swings in economic conditions and, all of a sudden, revenues are very different than what they had been. You simply don't have the ability to respond. Trevor said that should be a *changed or unforeseen circumstance*: the ability to deal with the situation. David J. said that not having the funds that the COT had committed as part of the HCP sounds foreseeable. When the money runs out, the USFWS might argue that the COT should have thought about the possibility of volatile swings in economic conditions. Dennis wondered what can reasonably be expected of a municipality to address some of these issues. If it gets to the point where, for example, something is going to cost 50 million dollars instead of 1 million dollars, that's not reasonable and is beyond the COT's capability and people's expectation. Trevor said he thinks that is easy enough to address by describing the COT's response as meeting with the TAC and USFWS to discuss reasonable approaches to addressing the issue with a reasonable amount of funding.

Guy said a good example is buffelgrass. The COT cannot deal with buffelgrass and never will be able to fully. It's beyond the COT's capability. Dennis said that even that could be broken down and asked Guy what he meant by "deal with." Dennis said that eradication is different than designating a special habitat area where the goal is to maintain that small area free of buffelgrass. So, the COT may say that it is going to attack buffelgrass in certain locations even though buffelgrass surrounds the area. Guy said that it's too late to stop the spread of buffelgrass and he's not talking about eradication since that ship left as soon as the first buffelgrass seed arrived. He said he doesn't think we can even stop its spread to any place. Ries said that the way he would answer the question is that these kinds of decisions are always political decisions and they vary with the times, circumstances, and how the COT's Mayor and Council feel. The more interesting something is in terms of it impacting the COT in a bad way, the more interested they would be in spending money on it. So, it's difficult to plan ahead and budget ahead in terms of a percentage of the COT budget to allocate towards *changed circumstances*. However, he said that he thinks the best we can hope for with the HCP is that we put in place procedures that keep the next invasive species for taking over like buffelgrass has.

David J. said that he thinks part of this depends on the scope of the expense. With other HCPs, a big component is purchasing State Trust land. If that possibility goes away, he wondered if there would be enough funding left over to address the issue other than to go back to the TAC to figure

out another answer. To him, that could involve starting the HCP process from scratch anyway. David said he didn't know if the Avra Valley HCP was reliant on State Trust Land. Jamie said that with the Avra Valley HCP, it's smaller in scope than the other HCPs in the area and consists of City-owned property only. He added that much of the funding for HCP mitigation measures to comply with the ESA is likely to be built into the cost of any of the Covered Activities, but this will be finalized in the coming months.

Trevor asked Marit if this was addressed in the USFWS 5-points Policy or some other federal policy that basically says that the USFWS would not require more than what the COT commits to doing once the ITP is issued. Marit said yes, that there would not be additional burden required of the COT. However, the caveat is that if circumstances were not considered that arise and cause jeopardy to the species, the permit can be revoked. So, it is beneficial to consider all of these circumstances. Rich said that if a new species is observed in the area like the ones that Trevor described earlier, a committee is likely to be formed. This committee will have a big picture view of the species and situation, such as its distribution and where the distribution is going to be most important to control. Rich said that he could see that committee giving the COT some direction or requests for management assistance. So, it will not be entirely the COT's decision; it would be the community's call. Trevor said he thinks it makes sense to lighten the response language and still work with the USFWS and TAC to point the COT in the right direction. In terms of thinking of other circumstances, Trevor mentioned the fact that the Covered Activities are based on Tucson Water's 50-year plan, which determined that approximately 7,500 acres may be necessary for future water infrastructure projects. He wondered what would happen if that changes and the COT determines that it needs twice that amount. He wondered if that is something the TAC should consider or will the HCP just go away and we just start over with a new footprint. Ries said that it sounded like Sherry said that if the HCP Planning Area boundary changes, this is a significant change that requires an HCP amendment. Marit said that if it changes the USFWS effects analysis, which it almost certainly would in the case of doubling or tripling the footprint acreage for Covered Activities, then an amendment would be necessary.

Jamie asked if TAC members wanted another chance to provide input on the *changed circumstances* table. Trevor said that based on his review of the first draft of the table and what he had seen skimming through the latest version, he thought that the table looked comprehensive and that the responses seemed reasonable. He said that it is just a question of these far out *changed circumstances* that we need to figure out how to deal with those and that's probably best for COT staff leadership to work through. Marit agreed.

#### Avra Valley HCP: Burrowing Owl Management Areas

Jamie said that the TAC has devoted a lot of time to discussing Burrowing Owl Management Areas (BOMAs), which is the proposed method of mitigating for potential impacts to modeled burrowing owl (BUOW) habitat in Avra Valley. In general, BOMAs are actively managed areas with artificial burrows, appropriate fencing, and some accommodations for public viewing/interpretation as well as some research potentially occurring. Jamie said that the Town of Marana is interested in partnering with the COT on cooperative conservation for HCP mitigation. As part of this, coordinating on a BOMA on COT land had been discussed, which has prompted a lot of discussion over allocation of credit and what specific tasks are required to



create, manage, and monitor a BOMA. He said that a detailed management plan is necessary to understand what each party would do as part of this endeavor and then how credits would be allocated. To better understand what the Arizona Game and Fish Department's (AGFD's) priorities are for BUOW conservation and to get a better sense of the management and monitoring activities that AGFD staff recommend, Jamie said that a meeting occurred recently involving two AGFD employees – David Grandmaison and Mike Ingraldi – as well as Marit and others. Jamie said that the two AGFD employees developed a document of recommended activities with cost estimates for TAC review and discussion. Jamie said that the purpose of this portion of the meeting was to have David G. present COT-specific BOMA recommendations to the TAC and get TAC member input on BOMAs, specifically about priorities for BOMAs in terms of management and monitoring.

David G. said that this would be the first, official BOMA in the state and would provide the opportunity to learn about how BOMAs are created and how effective they are. This is important because it is possible that other municipalities may want to implement BOMAs if they are found to be successful. David G. said that one of the first things he did is look at the objectives from the Preliminary Draft Avra Valley HCP, but he now thinks that some of them may have changed. Jamie said that since the 2008 Preliminary Draft was completed, TAC discussion has moved away from the objective to increase the number of breeding BUOW pairs. This is because of the many external forces beyond the COT's control that would influence this objective, making it difficult to know if the COT's actions were responsible for increases or decreases in breeding pairs. Jamie said that the most recent objective states: "Establish and actively monitor and manage Burrowing Owl Management Areas (BOMAs) for breeding, over-wintering, and migrating owls and public viewing/educational opportunities." Jamie apologized to David for the oversight of not bringing the change to his attention sooner than earlier this week.

David G. said that from the previous work that AGFD has been doing with artificial burrow monitoring, predation is an issue. Burrow availability in terms of size of relocation sites as well as prey base are also issues for long term persistence of these BOMAs. He said that he took the information AGFD has been learning from those studies and incorporated those into this COT BOMA recommendation document. This informed the question, "If we move forward with a BOMA, what are the key components that we need to know so that we can make changes if necessary as we monitor to inform additional BOMAs that may or may not be created through this HCP?" So, David G. said that the recommendation document was structured by specific biological objectives along with the procedures necessary to achieve, or at least assess, the objective. David G. said that the cost estimates for the activities are designed to be stand-alone.

David G. said that the first objective related to the idea that AGFD supports establishing a BOMA in Avra Valley and that AGFD intends to collaborate with the COT and TAC as needed. Objectives 2 through 5 get to the heart of a recommended biological study. Objective 2 addresses whether burrow availability is a factor in Avra Valley. Referring to the 2006 AGFD burrowing owl survey that was done in the winter and breeding season, David said that AGFD staff found that 40 percent of the burrows detected in the winter were destroyed or vanished by the time of the summer surveys. This may indicate that the soils may not be stable for long term persistence of burrows. This ties into the recommended monitoring. He said he didn't think that translocation was being considered for this BOMA. So, given the natural burrows in existence on these lands

and if artificial burrows are installed, this raises the question of whether or not this would increase the number of BUOW that remain during the breeding season. Built into the procedures would be to look at where the breeding pairs are and the proportion of burrows occupied.

Dennis asked if the main objective involves getting breeding BUOW to use the BOMAs or does the TAC want to be able to say that “we only have two owls breeding on the site, but 50 use the burrows during the winter. So, they are meaningful for the population at large even though we do not have large numbers of breeders.” If that’s the case, Dennis wondered if this would change the recommended monitoring. David G. said that it would change the monitoring strategy and so it would be important to do some non-breeding season surveys to look at occupancy, number of owls, and active burrows as metrics. Trevor asked if the habitat was modeled as breeding. Jamie said yes. David G. said that when AGFD did their survey, Simpson Farm was classified as breeding habitat based on vegetation characteristics and fossorial mammals present. AGFD found that, during the survey, there were more BUOW detected during the winter than during the summer.

Trevor said that he thinks the TAC should focus on dispersing BUOW before we get any breeding. They disperse through, find a place they like, stay through the spring, and then breed. Marit said that we wouldn’t want to lose the wintering habitat either because we don’t know how important it is. She said that she didn’t suspect that it would be lost if artificial burrows were installed, but would want to make sure that the BOMA continues to provide wintering habitat. Ries asked if it was safe to say that the kind of survey performed in the winter is one of the least costly monitoring activities performed. David G. said that the survey work gets more time intensive as one gets more specific about what is being measured. In terms of occupancy, this can be done at different times of the year by looking for ornamentation around the burrows, presence of BUOW, etc. If demographic parameters are of interest, this involves more intensive monitoring. Objective 5 gets into that with banding. David G. said that the COT BOMA recommendation document could be modified to include a survey in the winter and model it after what was done during the 2006 Avra Valley survey.

Paul asked if David G. knew from how far the wintering BUOW come in to the area to breed and whether the breeding BUOW in the area are going some place else. David G. said he didn’t think that was well known at this point. He said a University of Arizona study involved looking at resident versus migratory BUOW, but he didn’t know if that would help resolve this question because Paul was talking about BUOW coming from elsewhere to breed. David G. said that AGFD considers the population in the area to be partially migratory. Some are year round residents while others are not. Whether or not the BUOW in Avra Valley are residents or migratory, he said he was unsure. Trevor said that both sets of objectives talk about breeding and over-wintering habitat and so he said he thinks it is important to revise the recommended activities to have some wintering transects.

Rich said that is an area that is unique and has a lot of significance for over-wintering, migrating, and breeding BUOW. Exactly how the Santa Cruz Valley played into breeding BUOW historically is not known. Compared to a hundred years ago, farming is relatively new and common now that areas have been cleared. So with that background, we have an emphasis on all aspects of it: the migration, the breeding, and the wintering. Therefore, he didn’t think that

simply adding a transect for wintering would be sufficient. Instead, Rich said that he thinks that surveys should be conducted year-round. Since productivity would not be a consideration in the non-breeding season, additional surveys in the other three seasons would not be as time intensive. Rich said that he thinks the important question is what the BUOW use of the area is and how the population fluctuates over time. He said he envisioned the area as having a resident, breeding population in the late spring and summer. But, a pulse in the fall of BUOW coming across here and then most of them probably going south but a lot of them staying here. Knowing how the population of BUOW increases here is incredibly important information to have. For example, he wondered if the area is mainly used by BUOW for wintering. And, so it's important to get at the seasonal use of the area through surveys. He said he would structure surveys to get at the seasonality of occupancy.

Trevor said that if we concentrate on providing breeding habitat, then we're also protecting enough to incorporate migratory and wintering owls. Trevor said he thought the TAC also talked about incorporating interpretive signage as part of all bank protection work for river parks. These are the areas where interpretation would occur as part of installing artificial burrows. Monitoring would only occur casually in terms of the population status or maybe through University of Arizona graduate study work. So, Trevor said he didn't think that the TAC was forgetting about migratory and wintering owls. Trevor said he agreed with Dennis regarding the importance of capturing information on whether or not this first BOMA provides migrating habitat or wintering habitat in addition to the breeding. Rich said that he would not phrase it as "in addition to." Instead, he would say that monitoring needs to capture the seasonal pulse and not focus on the breeding, but focus on the use to find out if the area is major contribution to wintering populations, migratory populations, or breeding populations. Rich asked who the target "customer" is for a BOMA. He wondered about the situation where a BUOW or two use the BOMA and raise two or three young a year and they get killed by red tailed hawks as opposed to those being very important areas for migratory stopovers or wintering birds. Rich said that it is just like the warblers: The big conservation issue for these species was the wintering habitat and the migratory habitat. We don't know how this area contributes to BUOW conservation. Trevor recommended revising objectives 1 and 2 to get at that migratory issue. After this, he suggests that the TAC recommend objectives 1 and 2, which would provide information on the efficacy of the BOMA. Then, if we are not seeing efficacy of the BOMA, objectives 3, 4, and/or 5 may get to causality. If the BOMA is effective, Trevor didn't think the COT needed to dedicate resources to understanding why unless AGFD or researchers at the University of Arizona want to investigate outside the funding from the COT. Trevor said that he thinks the main issue is efficacy. That is: "Is this BOMA concept working and are there owls living there?" He said that there may be some reason why the COT partially funds objectives 3, 4, and 5 to help inform design of future BOMAs.

Rich said that if we are creating a BOMA for a migratory or wintering BUOW, it might be that they need the 30 acres or the 350 acres of open areas with holes visible to the BUOW that are scattered throughout the HCP Planning Area. So, in other words, a BOMA is not just a flat area with the mounds and the burrows; perhaps it is more like a canal bank that maybe has a little more vegetative growth around it. This area doesn't need to be predator perch proof because migrating / wintering BUOW would not hang out there and be exposed to predators. So, different BUOW would use this area as they come and go. So, Rich said he was proposing two different

sizes of BOMAs at different locations throughout the HCP Planning Area. Trevor said he liked this idea of experimental placement of BOMAs on the landscape. Rich said that perhaps they won't all be used during the breeding season, but maybe they'll be important during the migrating and wintering season.

Jamie said that, from the COT's perspective, a lot of the direction for BOMAs has been based on the 2007 Burrowing Owl Working Group Guidelines for Municipalities white paper. For example, the 30-acre minimum BOMA size is described in that document. He said that that guidance document was requested by the Town of Marana and the COT to inform BOMA establishment so that there would be consistency. He said that different acreage recommendations keep emerging from TAC members, making it challenging to plan and finalize the HCP draft. And, if there is going to be a cooperative effort on a BOMA with the Town of Marana, the BOMA size should be consistent with what the Town of Marana's HCP states.

Trevor said he always liked the idea of bigger is better. However, he said that he was fine with the BUOW Working Group recommendation of a 30-40 acre minimum size. And, if we're looking at mitigation for 300 acres, maybe the TAC should recommend eight BOMAs that vary in size, location, and vegetation communities. Dennis said he was starting to lose clarity on the difference between BOMAs versus burrow clusters. He said he was assuming that a BOMA could entail the entire 40, 300 or whatever acreage it is. Within that area, there are multiple burrow clusters. That prescription, as the COT BOMA recommendation document indicated may change depending on a number of variables. One variable is whether or not we are just concerned about breeding season BUOW or year-round BUOW. If the TAC is concerned about year-round BUOW, he wondered if that would change the prescription regarding how these burrow clusters would be configured, the density, and so on.

Dennis said the acreage recommendation is also dependent on what is available and wondered how many acres were available at the Simpson farm. Jamie referred to a large map on the wall that listed the acreage for the Santa Cruz, Simpson, and Hurst Farms. Dennis continued by saying that by knowing what is available when considering the placement and configuration of the BOMA, one knows how much acreage is available and since you there are power lines in the vicinity, the burrow clusters need to be moved to a more central part of the parcel. Trevor said that that is a big farm and there is plenty of acreage. He said that it also depends on Tucson Audubon Society's future plans for that area and whether or not Tucson Audubon Society's needs to expand its restoration activities. Trevor said that habitat restoration could be beneficial for BUOW, too. Paul said that, at the moment, Tucson Audubon Society is focused on riparian restoration. However, he said that the rules are going to change and involve continuation of riparian to upland.

Jamie said that when he and Ries recently met with three Burrowing Owl Working Group members as well as Kendall Kroesen (Tucson Audubon Society) and Janine Spencer (Town of Marana), the group talked about the benefits of these northern parcels for a BOMA or BOMAs. He said that this is not necessarily where all BOMAs would be located and the prescription for how clusters are configured would not necessarily need to be the same for all BOMAs, but he thinks the TAC needs to at least focus on details for this first BOMA. Jamie said that time is short for deliberations, especially for the Town of Marana, which is further along and has major

deadlines quickly approaching. Jamie said that what would be most helpful would be to have as many specific recommendations for BOMAs as possible. To stimulate discussion of management and monitoring activities, Jamie said that he listed some indicators, sensitive attributes, etc. on a flow chart for the BUOW based on the latest biological objectives and the COT BOMA recommendation document. Jamie said that, in this example, occupancy would be the primary measurement tool and, based on Rich's concern, could be expanded so that surveys are conducted seasonally. If lack of BUOW use or a negative trend is detected over time, say over a 5- or 10- year period, perhaps that would trigger the need for a higher level of research as described in the COT BOMA recommendations document. He said that he thought that the COT BOMA recommendation document could provide a menu of options the TAC could prioritize and use for making recommendations to the COT in terms of what is necessary to adequately mitigate for impacts to BUOW habitat.

Trevor agreed with the approach Jamie was suggesting and said that his only suggestion would be to include the winter and dispersing BUOW surveys. Trevor said that to get at the questions of location and size, he said that he would leave that up to AGFD, Wild at Heart, or whoever has the best information. Trevor said that he couldn't tell the COT how big to make a BOMA except for what is listed in the BUOW Working Group Guidelines for Municipalities. Trevor said that perhaps the TAC and COT consider doing a BOMA along the river park as the second BOMA, but it is actually associated with mitigation for this first round and monitor both. If there becomes a need to understand causality, then we look at the other objectives. Jamie asked what river park he was talking about. Trevor said that this would be a Town of Marana project, but thinks it would be good to do both at the same time to compare and contrast their efficacy for the species. In this way, Trevor said that there would be both breeding and dispersal habitat available that could be along a channelized river or park setting. Trevor said that the Town of Marana is going to establish a large heritage park right there and they are interested in incorporating BUOW interpretation. That is just south of the Simpson Farm.

Rich agreed on the need to determine specifics. He also said that he agreed with Jamie regarding the productivity monitoring, which may be nice to know, but not necessary to fulfill the COT's mitigation requirements. Rich said that the TAC should focus on the notion of burrow occupancy and check for presence or evidence each season. Trevor said that if we're not getting BUOW occupancy, we need to know why the BOMA is failing. Otherwise, the COT would not be in compliance with the ITP.

Dennis said that he thinks it is important for the TAC to recognize, at least in terms of the areas he is familiar with, that there are not many BUOW in the HCP Planning Area. In fact, the existing Simpson Farm site with artificial burrows had only one breeding pair the past couple of years. It is not like the TAC is going to be able to get baseline data and say "Oh, there are 25 breeding pairs in this area and so we're going to monitor how that changes from one year to the next." Dennis added that if we're not going to consider a translocation effort, we might expect to see very small BUOW numbers unless, by the installation of a BOMA, we obviously make a dramatic change in what is existing right now. Trevor said that is a good point and when the idea of translocating BUOW was rejected as a possible activity for these BOMAs, the concern then was that these sites would be translocation sites for home builders. Trevor said maybe we do need translocated owls to prove the efficacy of the BOMA. Dennis said he is not suggesting that

the TAC recommend translocations, just that the TAC needs to be realistic about the number of BUOW in the HCP Planning Area. Just because artificial burrows are installed and only one pair is observed over two years, this does not mean it is a failure.

Rich said that one thing about a BOMA as opposed to the migratory and wintering areas is that a nesting BUOW will be more demanding of the area. Specifically, they will be demanding of prey, lack of predator perches, openness, and areas that dogs and people don't visit. Another aspect is that they provide great interpretive value. Rich said that if the TAC decides to focus on how to create a good BOMA with measured characteristics like cleared area radius around burrows, how many young produced per year and prey type then we need to prescribe more precise measures for "burrow effectiveness." He said that he thinks the important issue is what Paul has mentioned: If there is no food, there won't be any BUOW. So, we should measure the food sources and how that affects productivity. If we did focus on the BOMA, we won't learn how important this valley is to the species during the other three seasons, and so he wondered if we are losing anything. He wondered if BOMA effectiveness would be best addressed through an academic study while seasonal surveys would be the responsibility of the COT. So, if we focus on what everyone is talking about, a BOMA for breeding, and how to build a BOMA for breeding that includes distance from vegetation and predator perches and really measured it, that might be the way to go right now.

David G. said that as he was putting the COT BOMA recommendation document together, he was tiering from the basic presence/absence surveys up to the demographic surveys. However, he envisioned them happening sequentially with triggers, which would have to be determined by the Burrowing Owl Working Group or the TAC. For example, if a certain level of occupancy or no occupancy is observed, then we will start looking at these other factors like prey, sources of mortality, etc. The first two years would examine burrow availability, then maintenance treatments, then prey, then sources of mortality. All of this would occur in a seven-year period. David said that the idea is to first addresses one objective and then move on to the next objective once one has gotten the information needed to determine effectiveness.

Ries asked if there was any chance of getting any grant funding since this BOMA is a first time endeavor. This is because it wouldn't just be useful for the COT to have this information; it may be useful for other entities. Dennis said that getting COT crews or equipment to do some of the artificial burrow installation could reduce costs. With regard to maintenance of sites, COT crews could probably do some of the work. Trevor said that since this is Arizona's first BOMA, perhaps it could be funded through Heritage Funds. He said he thinks that the BUOW is a target species for Heritage Funds. Jamie said that BOMAs would mitigate for COT impacts and provide ESA compliance. Therefore, so he thought that this would likely limit grant funding sources allowable for this work. However, if there are minimum mitigation activities that must occur, then the TAC could also identify additional research questions that outside grant funding could help answer. Ries agreed.

Rich said that in terms of the question of what needs to be done versus what would be nice to do, the non-profit organization, Wild at Heart, has been releasing BUOW for many years, utilizing both natural and artificial sites. He asked David G. is there is anything relative to objective 2 that the TAC could glean from all of the Wild at Heart work and if there is a summary of this. This is

what originally got the TAC concerned about all of the BUOW releases that Wild at Heart was doing because there is little or no oversight and there was no Burrowing Owl Working Group to oversee this. Wild at Heart was just doing this work. Rich said that he assumed that the 2007 Burrowing Owl Working Group White Paper of 2007 basically summarized a lot of this work that Wild at Heart has been doing. Rich wondered if a new summary of all the information Wild at Heart has would inform the COT's BOMA development. He asked David G. if Wild at Heart monitors their BOMAs. David G. said that Wild at Heart staff and volunteers have monitored a lot of their BOMAs, but not according to standard protocols. Rich said that this summary could be completed right now because it doesn't involve any experimental design, just review of records. Then, distribute a paper that might give AGFD decent guidance in developing BOMAs. And, find out at least from that where the gaps are so that the TAC can design something to fill in the gaps based on what AGFD staff think is most important to do and then go from there. In terms of Jamie's question about what do we need to do now, I think that would be a good first step to getting this going.

Trevor said that he disagreed. He said he thought that the COT BOMA recommendation document is what would be developed from a summary. He said that if one summarized Wild at Heart's findings, no matter what level of quality the data are, he thinks that it still comes down to the need to provide burrows, look at vegetation, look at prey, and look at mortality.

Rich asked if Wild at Heart had compared the artificial with the natural burrows. David G. said no. Rich asked if the data exists in raw form. David G. said he didn't know what Wild at Heart does in terms of monitoring natural burrows. His understanding is that Wild at Heart installs artificial burrows. Wild at Heart will inspect a property visually to get a general sense of suitability and then install burrows if it looks okay. He said he didn't think they are doing any detailed monitoring. Rich asked if David G. tracked Wild at Heart's activities. David G. said that they have volunteers who provide information, but it is not standardized. Dennis said that the anecdotal information that he had heard is that the BUOW will actually select the artificial burrows over the natural burrows. David G. said that is probably true in some cases, but in other cases, it is not. For example, he said that at the Maricopa Agricultural Center, there are BUOW that were raised in artificial burrows and moving into natural burrows, so there may be some flux back and forth. Trevor said that it is site specific, too. There are areas on the Simpson Farm where the soils are unstable and the owls would prefer artificial burrows. David G. agreed and he said that there are some areas where digging by canids would cause predation, but the artificial burrows do a good job of keeping the coyotes and dogs from the nest chamber. Rich asked if all of this was documented and summarized. He said that for all of the nest watch programs, every nest site every year is documented. Rich said that the state agency charged with managing wildlife likely would not allow another entity do this activity without any oversight or data gathering to find out if what they are doing is effective.

David G. said that AGFD has been monitoring artificial burrows for the past couple of years, but the funding is not there to continue that work. He said that AGFD wrote progress reports and that AGFD has been trying to do due diligence. However, he said that the sites AGFD began monitoring were the sites from when Wild at Heart first started installing artificial burrows and so they were smaller sites and more constrained in terms of vegetation and development. Now, the artificial burrow sites are much larger, so now they are essentially BOMAs. Rich said that it

sounded like these BOMAs were being created based on a hunch. Trevor said that they are establishing these based on need because of the number of BUOW that are being displaced by development. David G. said that that is part of it but said that they are basing recommendations on success and failure at certain sites, not on hunches. There is a method to what Wild at Heart is doing. Rich said that the reason why we are here is to get a more refined view, based on the COT's need, and maybe there is something that AGFD can summarize. As the wildlife management agency, AGFD may want to have a good understanding of this and summarize BOMA development in the state. He said that this information is probably in the heads of Wild at Heart staff members. This would inform what the COT needs to do. Ries said that it sounded like Rich was suggesting an additional task, which is review of existing literature or available data. Guy said that it might negate some of what's in this COT BOMA recommendation document. He added that he would bet that it doesn't because AGFD probably already knows what the successes are, but this would confirm that.

David G. said that in discussions with Wild at Heart, they're seeing more success at bigger sites with more artificial burrows installed. So, there is some of that anecdotal information that exists, which has informed AGFD's recommendations. David G. said that AGFD staff could meet with Wild at Heart staff and gather that information. Rich said that this could help to focus on some of the objectives based on what they are seeing. Rich suggested having a summit on this topic and find out where the data gaps really are. David G. said that the COT BOMA recommendation document identifies where these data gaps are in terms of AGFD's position.

Jamie said that that was the reason why Burrowing Owl Working Group members were invited to an informal meeting in October: To identify the important BUOW research questions that could be applied to this first BOMA that could then help inform future BOMA development. Jamie said that it sounds like there is only anecdotal evidence of what works best and he's also hearing that some of these success factors may be site specific. So, he wondered how one could control for the many factors, such as proximity to forage areas, burrow and prey availability, etc. that could vary across the species' range over time. He said that he is hearing that this research may be helpful, but wondered if, with the first BOMA, that the COT and TAC could begin to address the data gaps that AGFD has identified. That is, he wondered what research question is the most important and could be applied to this BOMA and how could that inform Wild at Heart's work, for example. Jamie asked Rich if that would be satisfactory. Rich said that, ideally, Wild at Heart's work would inform the TAC and the COT on this first BOMA, if possible. Marit reminded the TAC that the COT is working under a deadline to finalize the HCP in the next two months.

Ries wondered if the COT agreed to pay for all the recommended BOMA management and monitoring activities, or at least some portion of it, what else would be required in terms of costs and monitoring. He wondered if there would be equal effort for each species in the HCP. Ries said that he is trying to get back to the question of what the COT should be required to do to get the ITP. Trevor said that most of the other monitoring and mitigation activities seem pretty inexpensive as currently proposed. This is because monitoring would be tiered and would be somewhat minimal until a project is planned to occur. Then, at that point where a project will impact habitat and set-asides are established, more monitoring will occur. Trevor said that the TAC seems to agree on this approach. Ries said that Tucson Water is used to projects requiring



mitigation. The new and different aspect of the HCP and what will be a harder sell is anything that must be done prior to impacts. A likely question will be: “Why are you doing that mitigation when there is not even a project planned?” Trevor said that properly framing the issue will be important, reminding others that impacts to BUOW habitat will be mitigated differently than other HCP Covered Species in terms of monitoring and management. With CFPO for example, Trevor said that the TAC has a better understanding of what’s important and, for the purposes of this HCP, have identified habitat structure and prevention of fire threat as the two key areas for monitoring and management. However, unlike the CFPO, we don’t know how BUOW select habitat.

Rich said that he asked Scott Richardson (USFWS) his thoughts on the BUOW’s chance for being listed and he said that there was a petition or status review several years ago and it was determined that it didn’t merit listing at that time. However, Rich added that Scott said that grassland vegetation communities could be dramatically affected by climate change and so we don’t know what the future holds. Rich said that if the BUOW does get listed, it would be a major change. But, one thing we do know that is probably going to happen in areas where BUOW occur is that some Covered Activity will take place. So, based on the draft flowchart idea for monitoring and management that Jamie proposed, if the population decreases over a certain amount of time based on occupancy surveys, that is going to trigger some additional studies. And, that gets back to the importance of determining if prey abundance, etc. are important factors.

Ries said that he understands the benefit and necessity of seasonal surveys. In addition, if the COT commits to four surveys per year and this was a unique study and surveys were underway, perhaps these could be useful. But the question remains as to whether or not this would allow the COT to get its ITP. Jamie asked the TAC for input on what he included in the latest version of the monitoring and management flow chart for the BUOW. He said that, based on Rich’s recommendations at the last TAC meeting, he added public viewing/interpretation as a biological objective/general management goal. Dennis said that public use or viewing might impact the results of any research of BUOW at these BOMAs. Trevor said that we need BUOW interpretive management areas (BOIMAs) as well as BOMAs. BOMAs would be “no touch,” by not allowing public access.

Jamie said that it sounds like public viewing/interpretation may be optional, depending on the type of BOMA. He then reviewed the indicators and mentioned that site conditions would greatly influence the configuration and location of the BOMA. For example, the presence of cultural resources as well as floodplain boundaries may prohibit certain activities. Jamie reviewed the management objectives and said that he didn’t think that the COT would be able to make the commitment to answer all of the research questions recommended by AGFD for each BOMA. Therefore, the need for additional research would be triggered by a lack of, or downward trend in, BUOW use of the BOMA.

Jamie wondered if the TAC had any feedback on this approach or if it was satisfactory. Paul said that if monitoring occurred during migration and wintering, there could be something going on during the breeding season outside the property boundary that affects BUOW coming in. The COT would have no control over this. David G. concurred and said that, in this case, low BUOW

numbers would not be due to poor BOMA design or management, but something else. Paul wondered if the BOMAs within the Avra Valley HCP Planning Area would be located at both feeding and nesting areas. He also wondered if the COT would have to guarantee that there would be appropriate feeding areas nearby and how that would be safeguarded. Paul said that if we have successful breeding and there is nearby feeding habitat, but that feeding habitat disappears, that would likely affect use of the area for BUOW breeding.

Jamie said that one of the advantages to siting a BOMA adjacent to Tucson Audubon Society's restoration work is that Kendall Kroesen (Tucson Audubon Society) indicated that there has been an abundance of round-tailed ground squirrels on the site, providing burrows and prey. In terms of permanently safeguarding this, he didn't know if this is something that the COT could commit to, especially if it involved the adjacent agricultural lands that are not COT-owned. Jamie said that, in response to Paul's other question about outside influences, that the monitoring and management triggers need to be considered and established in such a way as to allow flexibility and natural variation. So, for example, it probably wouldn't make sense to base a trigger on only two years of data but perhaps a longer time horizon of 5 or 10 years of data would be appropriate depending on TAC expert opinion.

Paul said that he is not an owl expert, but in thinking about it, presence and absence during the breeding season would seem to not be very important regarding what one does about a site in terms of making sure there are not perches for predators. He said that maybe one has more control over what BUOW use the site during the breeding season versus any other season. Dennis wondered if good data exists regarding maximum distances BUOW will travel to forage or hunt from the burrows they use. David G. said that they have some telemetry data that may be useful to answer that question. Based on male home ranges – between BUOW males and females, males are the ones that forage and bring food items back to the nest – 500 meters is the radius around the nest burrow. However, in heavily urbanized areas, they appear to travel farther. However, David G. noted that this is not based on a good sample size of data; this is based on a couple of BUOW tracked in the Queen Creek area. Those BUOW used the urban matrix, going to baseball fields and hawking insects from lights. Dennis said that if we had any of that information it would get to Paul's point about whether or not BOMAs must be all inclusive or, if they have the perfect burrow set-up a mile away from good forage, they would willing to go that far to forage.

Marit said that that she thinks that the foraging area would need to be protected as well for adequate mitigation. Marit said that a buffer around clusters was mentioned at the recent meeting with three Burrowing Owl Working Group members to ensure some prey availability. She said she would be uncomfortable approving a BOMA that did not provide all that BUOW need. Dennis said that his question is derived from his personal observation of these smaller artificial burrow installation sites. He said that these BUOW are persisting in some areas where one looks around and wonders where they are getting any food.

David G. said that BOMA location could be based on results from a telemetry study. Trevor said that he trusts expert opinion from Wild at Heart or AGFD in terms of whether or not an area would provide for all of the species' needs. He said that he would propose using that approach initially. If the BOMA is found to be inefficient, then do an actual study.

Because of the flooding regime and soil stability on these lands, David G. said that lack of burrow availability is hypothesized as being cause for BUOW occupancy declines and is the reason why this is the first recommended study. Trevor agreed. David G. said that, when visiting the site, one sees fossorial mammals, grasshoppers, and all sorts of insects out there and so his guess is that there is prey to support BUOW because they are there during the winter and summer. But, if burrow availability is increased and there is still a declining trend in BUOW occupancy, then the next step would be to survey for prey and see if there is a density of prey large enough to support more BUOW.

Rich wondered how variable the burrows were in terms of hole width and depth. Rich said that with the Bald Eagle next at Tempe Town Lake, it is right next to a road and there is an irrigation ditch and people ride horses by it. It had three young last year because there is a great food source right there in terms of the borrow pit which has fish. They have been playing house for years and then they just build a nest as they approve of the area as a place to raise young because it has the resources breeding eagles need. That's why the focus on the burrow is getting the TAC off track. Trevor said that it is easier than prey availability and is why it is a good first step. So, he recommends as step 1, the continued guidance from AGFD and step 2 is the presence/absence of both burrows and BUOW. If there is no retention of BUOW on site, then that triggers the need to fund objectives 3, 4, and 5. It may also be important to gather experts on site to get a consensus recommendation on what's hampering the efficacy of the BOMA. Trevor said that, because these are questions of statewide importance, he sees no problem in applying for grants to answer some of these questions.

Rich said that if seasonal occupancy surveys were conducted, it would be easier to detect BUOW on the breeding sites because they will be persistent. David G. said that there would be a lot more sign around the burrows as well. Rich wondered if no BUOW are detected what action that should trigger. Trevor said that he thinks it goes back to expert opinion. He continued by saying that on a 30-acre site with a certain amount of burrows and given a certain percentage expected to have occupancy, the threshold should be based on a power analysis. He thinks this is the only way this can be done. Trevor asked David G. how many clusters with how many burrows are recommended on a 30-acre site. David G. said that 100 clusters were recommended because it's important to have a certain number for testing any management treatments. There are some recommendations in the Burrowing Owl Guidelines for Municipalities document in terms of distance between clusters and so that would be referenced for locating the clusters. Each cluster usually contains 16 burrows. Trevor said that it might be difficult to determine a threshold because of the low densities of BUOW. David G. said that this is why burrow availability is a question: Do more burrows mean more BUOW will use the site?

Rich reiterated his point that Wild at Heart's work should inform the burrow availability question and what an adequate threshold is for determining efficacy. So, Rich proposed information gathering as objective 1 and the seasonable occupancy as objective 2. Marit suggested that this information gathering was already done several years ago as part of the Burrowing Owl Working Group's effort. Trevor said that these are much more specific questions that are being asked now than three years ago. Trevor suggested that Jamie redistribute the minutes from the TAC meeting attended by Wild at Heart staff [*Action Item: Jamie will redistribute the minutes from the TAC*

*meeting attended by Wild at Heart staff*]. Rich said that he recalled being very satisfied with the discussion with Wild at Heart staff and, after that meeting, he visited one of their sites and was impressed by it. They seemed to have a strategy and lessons learned that were in their heads, but not written down.

Given lack of clear consensus among TAC members on various aspects of BOMA purpose, configuration, size, monitoring, management, etc., Jamie said that he would consider all the points made and talk with the OCSD Director and Tucson Water staff about next steps. He thanked TAC members and David G. for their time and input.

## **5. Upcoming meetings**

The next scheduled meeting is December 16, 2009.

## **6. Call to the Audience**

None

## **7. Adjournment**

The meeting was adjourned at 4:10 p.m.

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### Summary of Action Items:

- Jamie will redistribute the minutes from the TAC meeting attended by Wild at Heart staff